"WRITTEN SO YOU CAN UNDERSTAND IT."

POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

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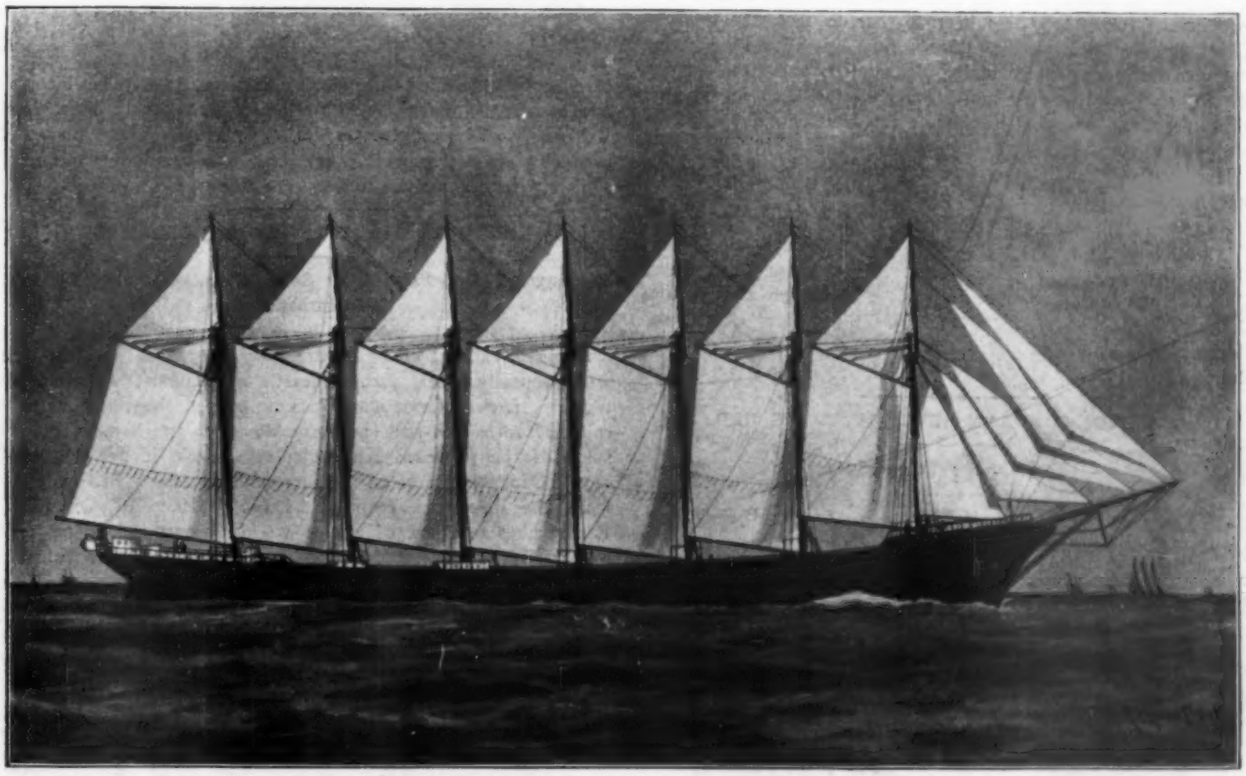
SEVEN-MASTED SCHOONER AMAZES SEAMEN

She is to be the Largest Sailing Vessel in the World, and is Watched with Interest



LENGTH 358 FEET; CAPACITY 8,000 TONS.

The first and only seven-masted schooner in the world is being built by the Fore River Ship and Engine Company, at Quincy Point, in Boston harbor. It was designed by B. B. Crowninshield for Captain J. G. Crowley of Taunton, Mass. Such a strange looking craft is it that the boat is attracting attention from all over the world, and there is intense interest in the speculation as to whether the builders can make a success of what old-time seamen have long considered an impossibility.

The vessel is built of steel, which makes it possible for her to carry the seven masts and the enormous weight. She is not only the largest fore-and-after ever built, but is the largest sailing vessel of any kind in the world. There is a picturesque significance in the fact that she is being built, not on the Maine coast, where wooden schooners have mostly come from, but in a modern steel "battleship yard."

The first schooner of any kind was built by a Yankee, and the seven-master is a logical development of the same idea. The number of masts steadily increased until the Governor Ames, a five-master, was built at Waldoboro, Me., as an experiment, twelve years ago. She attracted as much attention then as has the seven-master now, and people are wondering if an eight-master will ever be born. In 1900 two six-masters were built—the George W. Wells, at Camden, and the Eleanor A. Percy, at Bath.

The seven-master will carry about 8,000 tons, and it will require but 16 men to handle her. A square-rigged ship would need a crew of 35 men, but the schooner is bigger than any square-rigged ship ever built. The dimensions of the Fore River schooner are:

Length of load water line, 388 feet; moulded beam, 50 feet; depth from top of keel plate to top of upper deck beam, 34 feet 5 inches.

The first cost of the new schooner will be greatly increased by her double bottom. There will be a space of 4½ feet between her two bottoms, which will enable her to carry 1,200 tons of water ballast.

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The total sail spread will be 43,000 square feet. There will be two vertical boilers, 56 inches diameter by 90 inches height, built for a pressure of 100 pounds per square inch; one Hancock locomotive inspirator and one Watson injector of suitable size provided for feeding each boiler; one 9x10-inch Hyde double cylinder ship engine, and five 8x8-inch Hyde hoisting engines; two coil condensers, two direct acting steam pumps, two large duplex donkey pumps, two hand pumps, Hyde pump brake windlass, wildcats fitted for ¾-inch chain, with capstan and winch head in connection, a No. 11 Hyde improved Robinson steam steering gear, and other of the most modern improvements that will make this the most substantial, convenient and elaborately equipped sailing vessel ever built.

AMERICA LEADS IN PIG IRON AND STEEL

The United States is now the largest producer of pig iron and steel. The London Daily Main Year Book, in an article headed "Fight for the Iron Trade," says:

"It will be noted that the United Kingdom has lost ground, producing 396,749 tons less in 1900 than in 1899, the total for Great Britain being nearly 5,000,000 tons less than in America. An unsatisfactory feature in the British iron and steel trade is that in 1900 we imported more iron and steel than in any previous year, and exported less, while the United States exported more than ever."

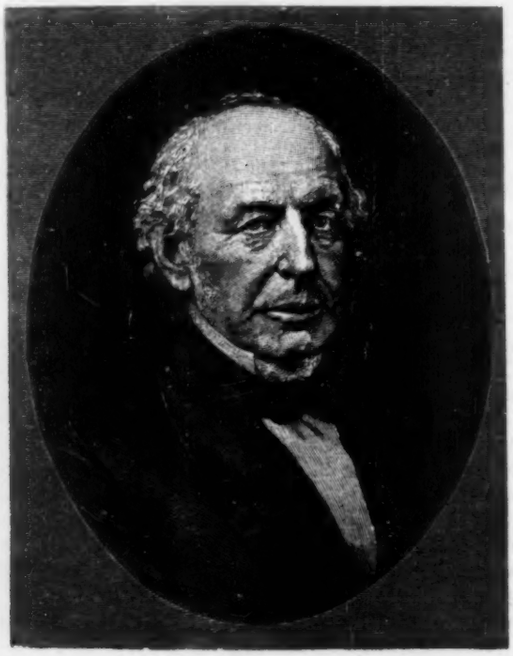
Here are some comparative figures showing the pig iron and steel production for 1900:

	Pig Iron. Tons.	Steel. Tons.
United States	13,789,242	10,087,322
United Kingdom	8,908,570	4,901,054
Germany	8,494,852	4,799,000
France	2,699,494	1,624,046
Russia	2,821,000	1,494,000

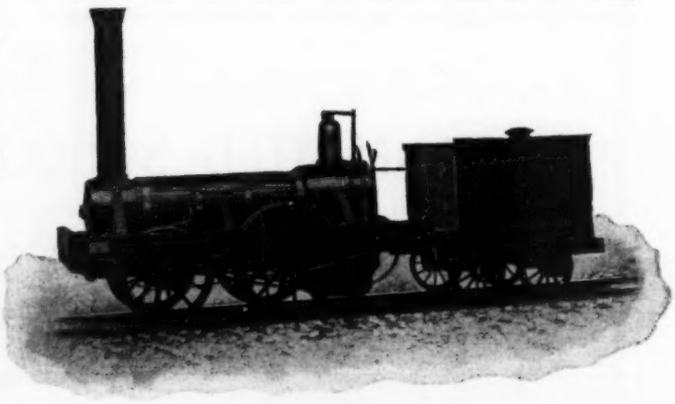
BALDWIN COMPANY SEVENTY YEARS OLD.

Built 20 000 Locomotives.

On February 27 the Baldwin Locomotive Works, Philadelphia, completed its 20,000th locomotive and celebrated the event and its seventieth year of existence. Matthias Baldwin, founder of the works, built its first engine in 1832, doing most of the work himself, and with scarcely any tools to work with. "Old Ironsides" was the name of this pioneer. It weighed only five tons, was mounted on four wheels. These wheels had cast iron hubs, wooden spokes and rims, and wrought iron tires. This locomotive cost $3,500, and attained a speed of 30 miles an hour. The Baldwin works to-day cover 16 acres, employ 11,000 men and turn out five locomotives every day. We are indebted to the Railway Review for the information and cuts.



MATTHIAS BALDWIN, FOUNDER OF BALDWIN LOCOMOTIVE WORKS.



OLD IRONSIDES—1832.

ROUTE OF CANAL LINED BY VOLCANOES.

Nicaragua Valley Formed by Seas of Lava—Strange Land of Disturbances.

Along a valley formed by the flow of seas of volcanic lava from opposite sides, through earth that almost continuously trembles from interior disturbances, and in the midst of volcanoes from which still spout smoke, ashes and flames, lies the route of the proposed Nicaragua canal. No longer ago than 1835 the inhabitants of all the surrounding country fled in terror from the disastrous eruption of the Volcano of Cosequina. Earthquakes now are of almost weekly occurrence. The very topography of the earth which was formed there by volcanic eruptions, is still undergoing radical changes of formation. New hills are made and new valleys result from the internal disturbances that seem to never cease. Should the Nicaragua canal be built there are grave fears that it would only be a question of time when it would be completely obliterated either by volcanic eruption or an earthquake.

These volcanoes originally broke out in the bottom of the sea, and by their continuous outflow built up and added to the continent 25 miles. Before the formation of the volcanoes the area which is now Lake Nicaragua, was a bay behind a long point projecting into the Pacific ocean to the northwest. The overflow from the volcanoes built up the shore until it connected with and covered the northwesterly end of this point, and this changed the bay into the present lake.

The canal location is on the west side of the Rio Grande and Los Lajas; on the east side, between Lake Nicaragua and the San Carlos and in the gorge of the San Juan. "The general plan of the topography," says a writer, "is very recent."

There are three principal mountain ranges, the Costa Rican, having peaks 10,000 and 11,000 feet high; the Nicaragua Highlands, with peaks from 5,000 to 7,000 feet high, and the West Coast Volcanoes.

The West Coast Volcanoes reach in many instances to a height of 6,000 feet. The volcanoes lie between the Nicaragua Highlands and the line of Costa Rican mountains. Characteristic of Central America, all have a northwesterly and southeasterly trend.

The volcanoes form a line of isolated peaks beginning with

Ometepe, in Lake Nicaragua, and ending with Cosequina, in the Gulf of Fonseca The total length of this volcanic range is 180 miles. Many of them are still smoking, occasionally ejecting ashes and heated stones and metals.

As the lava flow from these volcanoes covered the northwesterly end of the original point of land extending into the Pacific ocean, and changed the bay into the Lake of Nicaragua, so the southeasterly end of this point was covered and built up by the flow from the Costa Rican mountains. The two flows were toward each other, but did not quite join. Between these two flows is the location of the Nicaraguan canal.

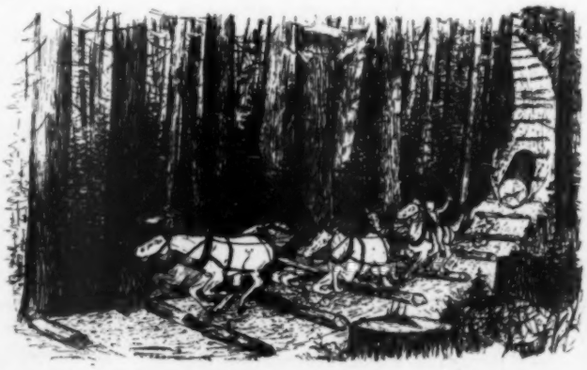
DEEP SEA FISHES INJURE CABLES

That inhabitants of the ocean's depths are responsible for most of the injury to submarine cables has been proven by recent discoveries. In a cable connecting Sydney with Nelson a serious defect was detected. On examination a shark's tooth was found imbedded in the sheathing. As that consisted of the usual thick iron wires and their outer covering, the aggressor must have given a hard bite. The motive is not easily divined. Could the shark have mistaken the cable in the imperfect light for a new species of conger, or did it, which seems most likely, blunder against it at a place which did not touch bottom, and relieve its temper by a vicious snap? A swordfish will express its resentment against a vessel by driving the bayonet at the end of its nose into the planks, and a narwhal will use its lance of ivory in a similar fashion, each, like the shark, to its own detriment, by loosing its weapon of defense. The conflict between the shark and the cable occurred 440 fathoms below the surface, a depth which, formerly, was supposed to be almost lifeless. Off the Portuguese coast, however, there is a regular fishery for a species of shark which is caught with lines at depth of 400 and 500 fathoms. As it is accustomed to live under a pressure of about eight atmospheres, it is dead—practically suffocated—when brought to the surface.

THRILLING FLIGHT FROM A FIR LOG.

Running from a bear, a lion or a wild boar in a wilderness is tame compared to being chased by a log on a down-hill grade. The latest instance is related in the Puget Sound Lumberman:

Down in the big timber of Lewis County, Wash., Jim Gilchrist bosses the logging operation for the Salzer Valley Lumber Company. A few days ago one of his drivers had a big



six-horse team hitched to a fir log 7 feet thick and 20 feet long. They had pulled it to the top of a long grade and Jim told the driver to go on. He obeyed. The teams set into their collars, the big log moved quite easily over the well-greased skids, and pretty soon the grade grew steeper and the log needed no help. The driver, who was riding a wheel horse, saw the danger for the horses he worshipped. There was but one thing to do, and that was to run. The horses seemed to feel the danger and were keen to go. Down the long grade they ran, chains and gearing flapping and jangling. Over the rough skids, muddy and dangerous, they raced, the log at times almost on the heels of the wheel team; a stumble, and all would be lost, but on they went, thundering and splashing down and out on to the level, till the chain tightened and the great dumb brutes knew they were saved and slackened their fearful pace.

DISTILLERY KETTLES IN CHURCH ADORNMENT.

The weather vane on top of the First Presbyterian Church at Morristown rests on a ball which was made from three distillery kettles. The vane was paced on top of the church when it was built in 1791, when weather vanes were popular adorn-

ments. A new church has recently taken the place of the centenarian and the steeple on which the vane rested, was sawed off several feet below the top. The copper ball, says the Metal Worker, retained a remarkable trueness of form testifying to the skillful handicraft of the coppersmith who produced it. Above the vane is another copper ball, 9 inches in diameter, while the lower ball is 2 feet in diameter. The top of the spire terminates in a graceful trident.

The other illustration shows a weather vane used on the estate of Lord Sterling at Somerville, N. J. The two bullet holes in the vane are mementos of an engagement between the Continental troops and King George's army.

THE KING AND THE TELEPHONE

When Korea was first opened up to the world a foreigner desired to introduce the telephone into the country. The king was willing and ordered that the tomb of the queen dowager should be at once connected with the royal palace. He had been told that the telephone enabled one to converse with those who were too far away to either be seen or heard. He wanted to talk to his mother who had been dead for several months. When the apparatus was complete the poor king listened in vain for any reply from his royal mother. Then he was very angry. The telephone was a fraud. He had given it a fair trial and found that it was a foolish pretense. As for the stranger there was no truth in him and he must depart forthwith. The telephone agent was glad enough to get safely out of the country.

Easy Electrical Experiments

FOR BOYS.

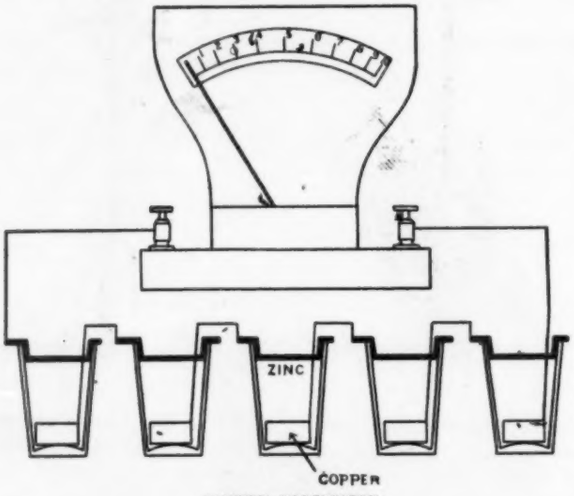
CHAPTER X.

ADJUSTMENT AND USE OF A SIMPLE VOLTMETER.

By L. P. Dickinson.

The voltmeter whose construction was explained in the last article is not ready for use until it has been calibrated. By calibration, we mean the fixing of points upon the scale, so that we can tell instantly the value of the voltage which causes a particular deflection. To do this, there will be required a battery of special form. The cells composing this battery can be made in a very temporary and easy manner, and will answer the purpose perfectly. They are made as follows:

Procure five ordinary tumblers and in the bottom of each place a strip of copper one inch wide and three inches long with a copped wire attached to it, projecting from the cell. In the top of each tumbler hang a strip of zinc a little longer than the copper strip, supporting it in the manner indicated in the



SIMPLE VOLTMETER.

figure below. Connections should be made to the strip, outside the tumbler, by a piece of wire firmly twisted around it. Place in the bottom of each tumbler a handful of blue vitriol (copper sulphate) and fill them with water so as to cover the zinc strip. Connect the zinc and copper terminals of each cell by a short piece of wire, and let them remain this way for twelve hours, at the end of which time the connecting wires should be removed. Then join the cells in series—that is, connect the zinc of the first cell with the copper of the second and so on throughout the series. Be sure that the wire leading from each copper strip does not touch the zinc in the same cell. The electromotive forces of the cells are then added together. Connect the terminals of the battery, that is the copper of the first cell and the zinc of the fifth cell, if they are joined as above described, to the terminals of the voltmeter. The needle of the latter should move part way across the scale. If it does not, reverse the connections of the wires leading to the instrument. Now adjust the counterweight by making it heavier or lighter, as the case may require, until the pointer stands exactly at the middle of the scale. Make a line here and mark it 5 volts. Disconnect one cell leaving only four in series, and again mark the position of the pointer. This will give very nearly, the position corresponding to 4 volts. Again disconnect one cell, leaving only three in series, and note the position, mark it 3. Proceed thus until five points are marked upon the scale corresponding to 1, 2, 3, 4 and 5 volts. It will be found that the spaces between the various points are not quite equal, that at the center being the longest. On the other side of the middle point, the spaces should be marked like those already found, with the longest space at the center, gradually decreasing in width until the tenth line is drawn. These lines should then be plainly numbered from 1 to 10, as in the figure.

The reasons for the process just gone through are not difficult to understand. Each cell constructed as described gives on open circuit an e. m. f. of 1.08 volts. The five cells in series, would give us five times this amount or 5.4 volts, on open circuit. But as soon as they are attached to the voltmeter their voltage fails, due to the current through themselves, so that their combined voltage is then very close to five volts. Similarly, four cells give us very nearly four volts and so on. Beyond the middle point of the scale, the points would be found to be similar in their position to the first five found, so we can mark their position without the necessity of actually constructing the cells necessary to cause the corresponding deflections. It must not be understood that the cells described are suitable for practical work. They will probably give out entirely after a few days, but for the purpose of adjusting the voltmeter they will answer as well as an expensive battery.

A voltmeter is always connected directly to the points between which it is desired to measure the difference of potential. This is done without disturbing the connections of the rest of the circuit. Thus, when we wish to measure the difference of potential across the terminals of a motor, the terminals of the voltmeter are connected to these points, without disturbing the rest of the circuit. The instrument and the motor are then connected in parallel, or in shunt, these two terms being used to designate the same thing.

ON THE USE OF VALVES.

A writer in the Practical Engineer in discussing the use and abuse of valves says:

When a valve is wanted near a right angle turn in a pipe line, it is generally a good idea to use an angle valve instead of a globe or a gate valve, and an ell, as it calls for less joints to make and keep tight, and it makes a better looking job, also because less friction will be caused by water or steam passing through the line.

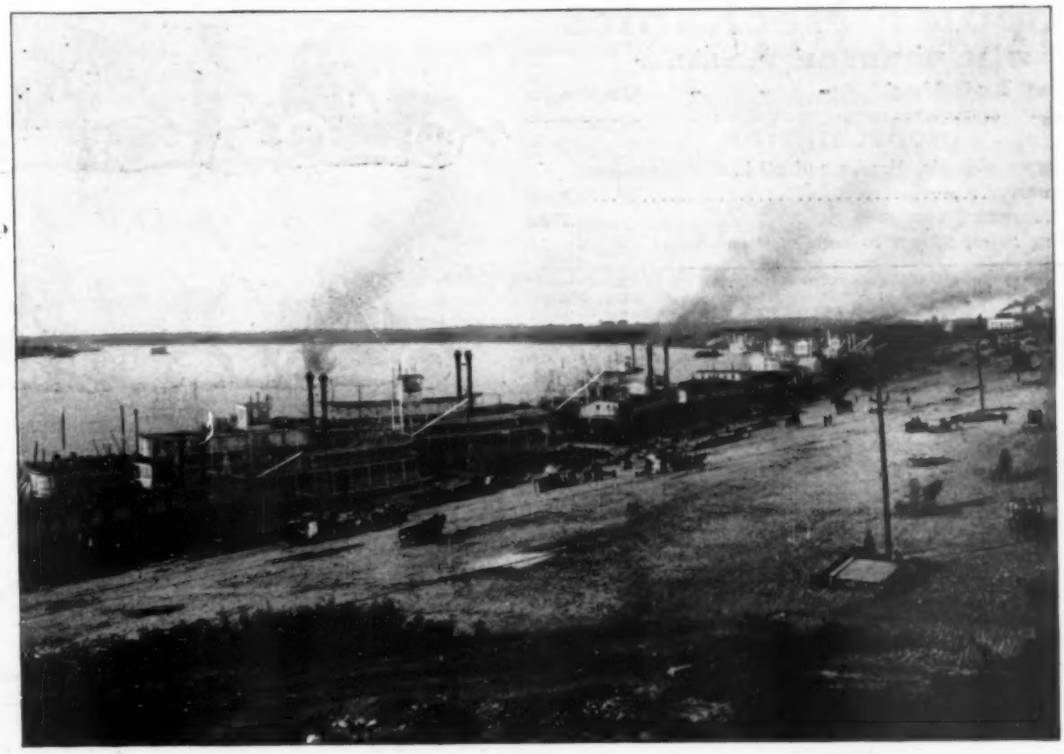
On pipe lines that are to convey superheated steam from one point to another, it is not wise to use valves with hard rubber discs in them as the heat will dissolve them in a short time. Use only brass or gun metal valves for such places or remove the hard rubber disc and substitute one made of bronze.

This does not necessarily mean that a separate superheating device is to be used in the plant, as some of the water tube or pipe boilers supply steam that is superheated enough to dissolve the best hard rubber disc now in the market.

Devices have been contrived for removing worn out discs, but the need of them is not apparent. A small cold chisel and hammer seems to answer every purpose for large valves, and when the bonnet of a small one is removed and the disc held in a gas jet for about two minutes it can be removed very easily with a stout knife.

The bonnets of large valves are usually held on with bolts, hence are easily removed, but small ones sometimes cause trouble, as the brass is soft, so that when an attempt is made to remove them the wrench rounds the corners off without removing the bonnets. The largest available wrench should always be used for such work, because a small one will spring and damage the bonnet more than a large one. Screw the jaws up as tight as possible, then strike the handle a smart blow with the hand or a mallet.

The total number of Indians in the United States and Territories is 129,518.



DAILY SCENE ALONG THE LEVEE AT MEMPHIS, TENN.
(Courtesy Grain Dealers Journal.)

TESTING THE VELOCITY OF PROJECTILES.

Greatest Accuracy Made Possible By the Use of the Chronograph.

The time has come when the testing of a gun is a careful and methodical operation. For testing the velocity of the projectiles, a chronograph is used. This consists of three parts—a powerful magnet, a steel rod and a knife blade. The chronograph is mounted on a structure set at considerable distance from the emplacement upon which the gun to be tested is mounted. This is to obviate jarring when the piece is discharged. At the top of the machine is the powerful magnet which, when the current is closed, holds the rod suspended. The rod hangs over an aperture in the base of the instrument, and at one edge of this opening a knife-blade is placed and held back against a spring by another electro-magnet. The brick foundation upon which the instrument is built goes many feet into the ground in order that the greatest stability may be obtained.

To return to the gun, two square frames are erected on the line of fire, the first one a hundred yards from the muzzle of the gun, and the frames exactly one hundred yards apart. Back and forth across these frames is a network of wires; or rather a cross-weaving of one wire which runs from the frame to the instrument in the distane house, and is connected with the electro-magnet which holds the slender steel rod. The second screen is like the first, save that its wire runs to the second electro-magnet, the one holding back the knife-blade at the base of the chronograph.

Then, with the current on, the rod suspended, the knife-blade restrained against the spring, the gun is fired. The projectile pierces the first screen, the wire is broken, the circuit is opened, the magnet is demagnetized instantly and the rod drops. The projectile speeds across the hundred-yard space and pierces the second screen, breaking its wires and breaking the electric circuit. This releases the knife-blade, past which the rod must fall, and, energized by the spring, the blade flies forward and strikes the rod, making a minute nick upon it. By this time the projectile has flown into the great sand butt and buried itself, and the nicked steel rod has dropped into a sand-filled receptacle. The velocity has been denoted by the utilization of the law of falling bodies. A body will fall 16½ feet the first second, 33 feet the second, and so on in this ratio until it reaches earth. Applying this principle to the rod, it is known that its foot was exactly at the level of the blade, so that measuring the distance from the foot to the nick, gives the space through which the rod has fallen. Then, remembering the gravity law, that a body falls 16½ feet the first second, it is readily determined how long the shot has required to cover the 100 yards between the screens. This gives practically the initial velocity of the projectile.

MARCONI'S OWN COUNTRY DENIED HIM AID.

Like Columbus He Was Compelled to Wander to Foreign Lands to Obtain Funds.

Like Christopher Columbus Marconi claims that he was compelled to leave his native country because denied the financial support necessary to conduct his experiment. He pleaded with the Italian royalty and men of wealth, but they looked on him as visionary and would scarcely give him a hearing. In America and England he was readily furnished $1,000,000 with which to prove his claims that telegrams could be sent without the aid of wires. The Marconi company has made contracts with Great Britain for the installation of the wireless system on naval vessels for 15 years at $50,000 a year. He says he intends to commence his operations between continents by cutting the transatlantic cable rates one-half, and will afterward reduce the rates for short distance land service. He offers $500 to any one who can interrupt or read one of his wireless messages.

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WEALTHY BOSTON GIRL A BLACKSMITH.

Works at the Forge Because She Likes It—May Become Naval Constructor.

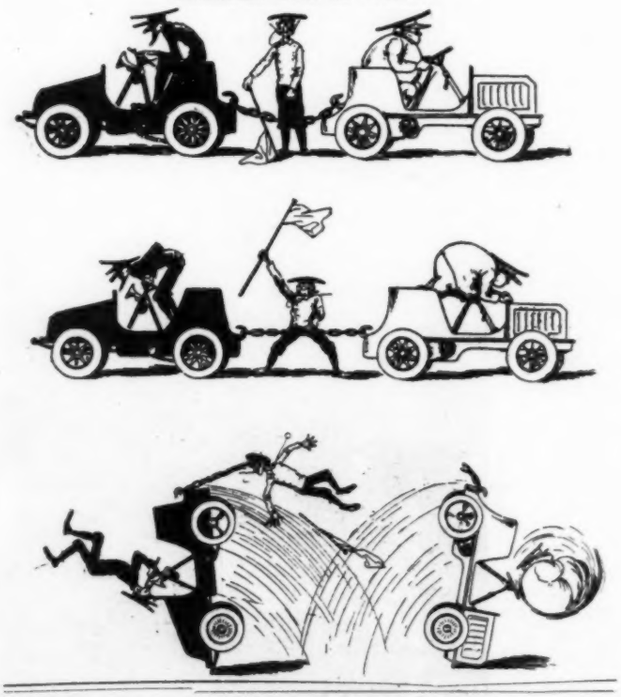
Of athletic form, muscles hard as iron, a face glowing with richest health, Miss Lydia Weld, who has the distinction of being the only woman blacksmith in America, is now pursuing her fourth year in naval architecture at the Massachusetts Institute of Technology and has outclassed many of her masculine associates. She is of wealthy parentage and is studying the vocation, she says, "for pure love of the work." She will finish the many courses of Boston's famous school for engineers in another year, and, it is said, has been offered a position in the big Cramp shipbuilding concern at Philadelphia, as naval constructor. If she should accept, the United States will be the first country to have a woman actively engaged in this profession.

Miss Weld is 25 years old. During the hot summer months she worked in the blacksmith shops daily from 9 until 4. She has become an expert machinist, as blacksmith and forger, making all kinds of machinists' tools, dies, milling cutters, etc. Now her work is in the line of naval ship designing, known as naval architectural drawing, studying the effect of waves upon ships and the manoeuvering of a vessel. Miss Weld is typically a Boston girl. She was formerly of Cambridge. She came to the Massachusetts School of Technology from Bryn Mawr three years ago and then began the work of welding and forging in the shops and the laborious hours in the draughting room. She performs on the piano and the Italian harp with deftness. Her many accomplishments, her rare beauty and wealth combine to make her a favorite in society, but she never neglects her studies in the institute for social pleasures.

EDINBURGH'S CABLE SYSTEM A FAILURE.

The Municipal cable system installed in Edinburgh in 1897 has proved a costly failure, says the Street Railway Review. In 1892 the municipality acquired the horse tramways for the sum of $1,070,000. The council decided that the citizens would not permit the streets to be disfigured with the overhead trolley system and the underground trolley system was considered too expensive, so the cable was finally adopted, although it was pointed out at that time that cables were being abandoned as out of date in the United States. It was estimated that a cable plant could be put in operation for about $3,900,000, but the expense has already reached $5,840,000 and the system is not yet complete. A number of costly mechanical devices for conducting cars around complicated curves have been tried and abandoned. Following these mechanical failures comes the failure of the company which leased the tramways to pay the agreed 7 per cent on the capital expenditure, which amounted to about $389,320 a year, and which the leasing company declares it cannot pay out of the earnings. It has therefore applied to be relieved of its lease, and the city is suing for a large amount of arrears.

MODERN TUG OF WAR.



WORLD IS GOING CRAZY, SAYS DR. HOYT.

Present Rate of Insanity and Criminality Gives Cause for Alarm.

Dr. Benjamin R. Hoyt of Detroit has figured out that the world will be mad within three centuries at the present rate of increase of insanity. He says:

"During the past fifty years the number of insane persons and fools has increased 300 per cent. During the last decade the increase of population has been 30 per cent, and the apparent increase in the defective classes has been a little more than 155 per cent.

"The United States census of 1890 showed the total number of persons in prisons to be 82,329; number in juvenile reformatories, 14,846; number in almshouses, 73,045; inmates of benevolent institutions, 111,900; number of insane, 106,445. Total number belonging to defective classes, 403,615.

"In 1850 one person in every 3,500 was a criminal. In 1890 there was one criminal for every 786 of population, an increase of 445 per cent, while the population increased only 170 per cent.

"We are rushing toward an abyss that will engulf the world unless something is done to check immorality and neglect of the laws of nature."

Most of our sponges come from the West Indies. They are sowed like wheat and when large enough are detached from rocks at the bottom of the sea. Originally the fisheries were adequate, but they would soon become exhausted nowadays if the sponges were not planted.

SIMPLE ELECTRIC FLASH LAMP.

Easy to Make One With the Aid of a Piece of Tin, Dry Batteries and Wire.

The Photo Beacon tells of a good way to make a flash-lamp suited for interior and out of door work: Make a box out of ⅜ inch walnut, enough to hold four dry batteries and a spark coil and to afford ample room for connections. Have a

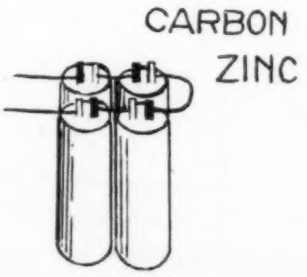
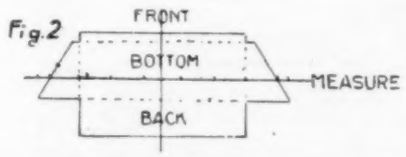


FIG 1.

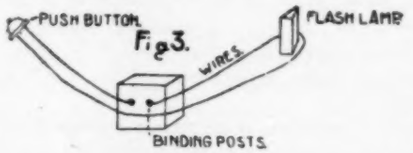
close fitting lid. The four batteries should be connected in a series, that is zinc to carbon (Fig. 1). The two terminal wires should be fastened to the spark coil and the ends of the two wires from the spark coil should be fastened to two binding posts at the front of the box.

To make the flash lamp get a piece of tin or sheet iron 7½ inches long and 3¼ inches wide. The bottom of the pan or tray is to be 5 inches long and 2 inches wide. The front is



¼ and the back 1 inch in height. Cut the two sides as shown in Fig. 2. Bend up the four sides and solder the corners together. Get a 20-foot piece of copper wire and cut it into three pieces, two of which should be 5 feet long and one, ten feet long. Insert them in two holes, one at the front and one at the back, about ⅛ inch from the bottom. They should be so well insulated as to allow none of the electricity to escape and should project far enough in so that the ends of the wires are not more than ⅛ inch apart.

Fasten the ends of one of the pieces of 5 foot wires and the ten foot wire to a push button. Connect the end of the 5-foot wire to one of the binding posts on the box and the other end of the 10-foot piece to one of the wires on the flash lamp. The one end of the other 5-foot piece should be fastened to the other binding post and the remaining end should be attached



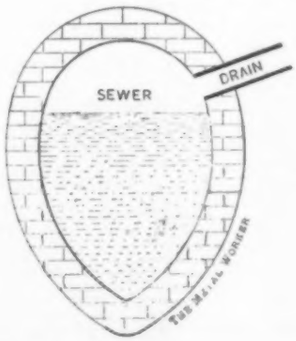
to the remaining loose end of the wire on the flash-lamp. (See Fig. 3.) The flame lamp should be fixed on a stand. The push-button can be laid on the top of the camera and when taking a picture press the button and the bulb at the same time.

The smallest book in the world is one written in the Gurmuthl language and originally found in the golden temple of Armitsar, India. It is about the size of a postage stamp and bound in red silk with stiff covers. There is one copy in the British museum, London, and another in the Field museum, Chicago.

MAKING SEWER CONNECTIONS.

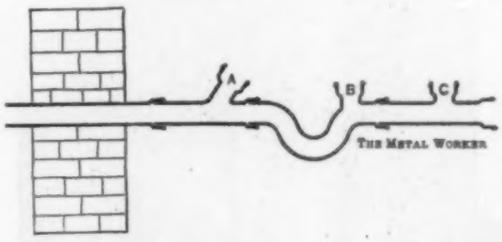
An interesting article appears in the Metal Worker for Feb. 1, from which the following is taken:

In connecting a house drain should the main sewer be built of brick, the connection should be made to it near the top, as shown in Fig. 1, for the reason that the pipe will be well up out of the running water. If it was connected near the bottom the water would back up in the sewer pipe and might possibly be the means of stopping it or flooding the cellar if there was a cellar trap. But if it is a terra cotta sewer a Y connection should be put in on the lower side of the building lot, so that connection can be made to it at any time. The Y should have a slight pitch toward the house. A connection should never be made directly on the top, as it would require a very short turn in the connection and increase the difficulty of clear-



ing with a rod in the event of a stoppage. Into this Y should be connected an eighth bend; usually 6 inches in diameter, as that is the size of the Y generally used in the main sewer. From this eighth bend the drain pipe would be run to the house. The grade would have to depend on the pitch that it might be possible to secure for the house sewer. If the house is on high ground and the drain can be given 1 or more inches to the foot, so much the better, but if it can be given ¼ inch to the foot it will give good results, as that grade is considered sufficient fall for a sewer pipe.

Should there be occasion to use the intercepting trap and fresh air inlet perhaps the sketch given in Fig. 2 would be the means of making clear the best way to place it. Just inside



the wall place a full Y branch, A. Into this Y connect the trap with a hand hole, B. About 2 feet further on connect a tee, C. From this tee take the fresh air inlet. The Y is for the purpose of cleaning the house sewer should it get stopped up. The hand hole, B, is for cleaning the trap, and the reason for taking the fresh air inlet from tee C is that if it was taken from B in very cold weather the water in the trap might freeze from the cold currents of air passing down and over it from the fresh air inlet and to stop up the system.

Cast iron pipe is best, but unglazed terra cotta must never be used, as it is porous. Even the glazed is liable to damage from roots of trees or bushes. It is wonderful how fast they will grow once they get an opening in the pipe. I have known the roots to grow for 20 or 25 feet and nearly always toward the house on account of the grade. They grow until they entirely stop up the sewer.

FATHER O'SHEA AND FATHER M'CREA

You might search the world's ends,
But you'd find no such friends
As Father O'Shea an' Father McCrea.

Very caustic in wit
Was Father O'Shea,
But as droll every bit
Was Father McCrea.
And oh, such a volley of fun they were pokin'
The one at the other, as good as a play,
With their ready replies an' their innocent jokin',
When Father O'Shea met with Father McCrea.

Now, on a March Sunday it came for to pass
Good Father McCrea
Preached a very fine sermon and then after mass
Met Father O'Shea.

"'Twas a very appropriate sermon for Lent
You delivered this minute;
For the season of fasting 'twas very well meant—
I could find no meat in it!"
Said Father O'Shea.

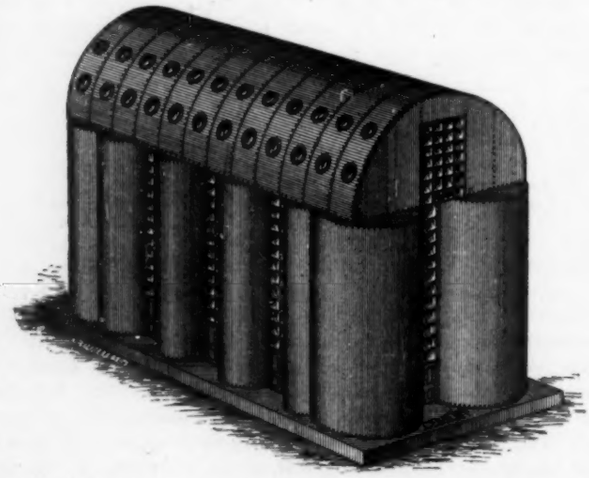
Then, as quick as the laughter that gleamed in his eye
Good Father McCrea
Raised a hand disapprovin' and made his reply
To Father O'Shea:
"Faith I'll have to be working a miracle next
To comply with your wishes.
Dare you ask me for meat, my dear sir, when the text
Was the 'Loaves and the fishes?'"
Said Father McCrea.

Very caustic in wit
Was Father O'Shea,
But as droll every bit
Was Father McCrea.
Though you'd search the world's ends
You would find no such friends
As Father O'Shea and Father McCrea.

—Catholic Standard and Times.

STEEL FLOUR MILL.

To produce a fire and moisture proof flour mill and grain storage tanks, has been the effort of a New York miller. Our illustration is from the American Miller and conveys a good idea of what the designer suggests—a building constructed of iron and glass set on cement.



The official title of the British sovereign, formally and legally adopted is "Edward, the Seventh, by the Grace of God, of the United Kingdom of Great Britain, and Ireland, and of the British Dominion Beyond the sea, King, Defender of the Faith and Emperor of India."

FASTEST BOAT OF HER TYPE ON THE LAKES.

"Emanon" is said to be the fastest and most perfect boat built under the new rules of the Inland Lake Association. The designer, Daniel Zook, in his plans was greatly influenced by the local conditions of the water where the boat is to be raced. She is an extreme scow with dimensions as follows:

Length over all	37	ft.	5	in.
Length water line	21	ft.	0	in.
Beam extreme	7	ft.	5	in.
Freeboard least	0	ft.	11	in.
Draught of hull	0	ft.	4½	in.
Draught board down	4	ft.	6	in.
Sail area	500	sq.ft.		

The boat was built for Jones & Laborde, of Oshkosh, Wis.

CADMIUM TO AID STORAGE BATTERY.

Newly Discovered Metal Used by Edison in His Latest Invention.

It has been learned that cadmium is an essential element in the construction of the new light-weight storage battery recently invented by Edison, which promises to create a revolution in the development of electricity. This knowledge follows close on the announced discovery of cadmium ores of great quantities in Aspen, Col. If true the increased supply of this metal from this source comes at a time when it is quite sure to be of high service in the development of the much needed new storage battery.

The output of cadmium at present is estimated at only about two tons a year. It comes principally from Silesia and Belgium, where it is reduced from zinc ores in which it frequently occurs. It also occurs in a combination with sulphur in a rare mineral called greenokite. From this is manufactured cadmium yellow, a pigment used by artists. It is also used for coloring soap, for calico printing and for giving a yellow lustre to porcelain.

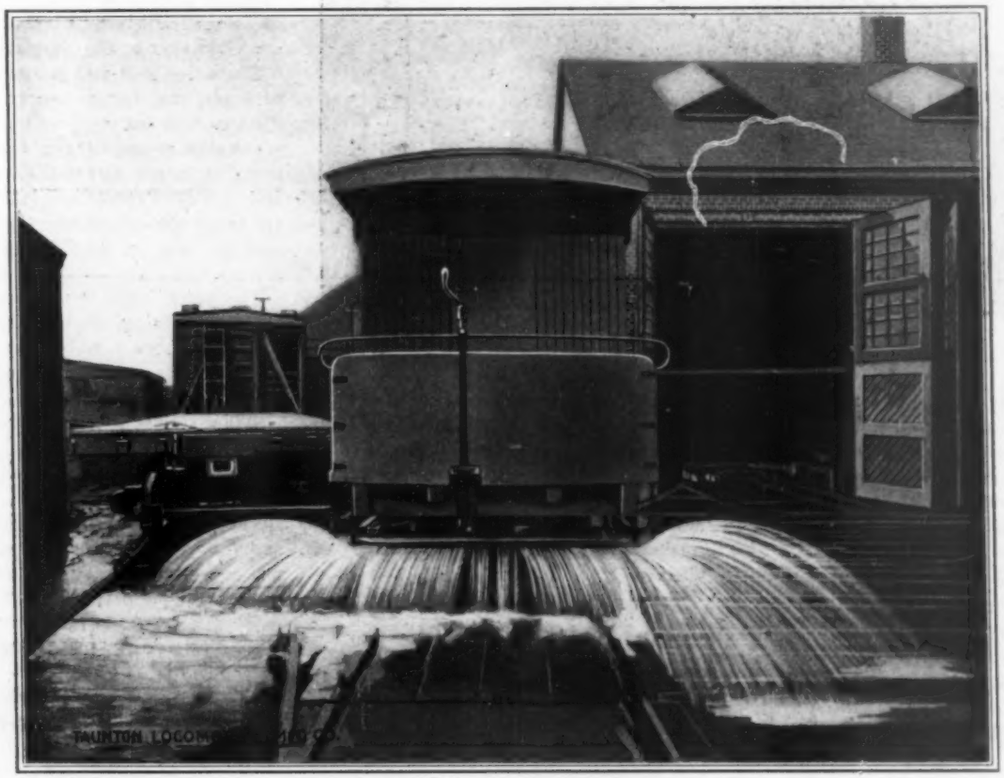
There are 41 forest reserves in the United States, created by presidential proclamation, embracing an estimated area of 41,410,209 acres.

DEVICE TO WARN ANIMALS

Drivers of gasoline automobiles will be interested in an arrangement used by A. Auble, Jr., Wadsworth, O. He has fixed his exhaust to escape without passing through the muffler when desired, and the noise which results serves to frighten away dogs and other animals in the road.

SPRINKLING STREETS BY TROLLEY CARS

Among the numerous improvements which have come with the advent of trolley cars is that of street sprinkling. Nearly all companies now sprinkle their tracks to lay the dust, and in some cities sprinklers are in use which throw water clear to the curb. The sprinkler we illustrate



TROLLEY CAR STREET SPRINKLER.

was built by the Taunton Locomotive Works, and will sprinkle a strip 20 feet wide. The water is carried in a big tank inside the cab. The car may be run either with its own motors or hauled behind a passenger car, as a trailer.

FISHING AT ROCKAWAY, L. I.

About the only fishing done at Rockaway now is what the beach folk call frost fishing—whiting—and for a successful trip all that is needed is a smooth sea, wind off shore, good sight, good hearing and a basket. In a walk of a mile or two along the beach a basketful of fish, weighing from one-half to three pounds each, can be picked up. It seems that the whiting, in feeding, chase the bait (speering and silver eels) with a fierce rush upon the sand, and in so doing are left high and dry. That is where good hearing comes in, as the fish flap on the sand, and all one has to do is to follow the sound and pick them up. On a still night there must be millions of fish close to shore, as the fishermen sometimes go off in a boat with a light reflecting in the water and with a hand net fill the boat. The fish refuse to take the bait, I suppose, on account of the immense quantity of live bait in the water.

"NO CURE, NO PAY."

A firm in Chicago makes a leather machine belt which it has named the "Electric" brand. A farmer saw the advertisement and sent $1.50 for one for his son, says the American Miller. The merchant had a piece of belting cut off, two feet long, four inches wide, and nearly half an inch thick. This he sent with the following letter:

"I am sending you a sample of my 'electric belting,' and as I am afraid you are laboring under some misapprehension, I return your money order. At the same time I have no hesitation in saying that if you will use my 'electric belting' on your son in the right way it will do him a great deal of good. I know of no better way to cure disobedience, if he ever suffers from that complaint."

QUEEREST TOWN IN AMERICA

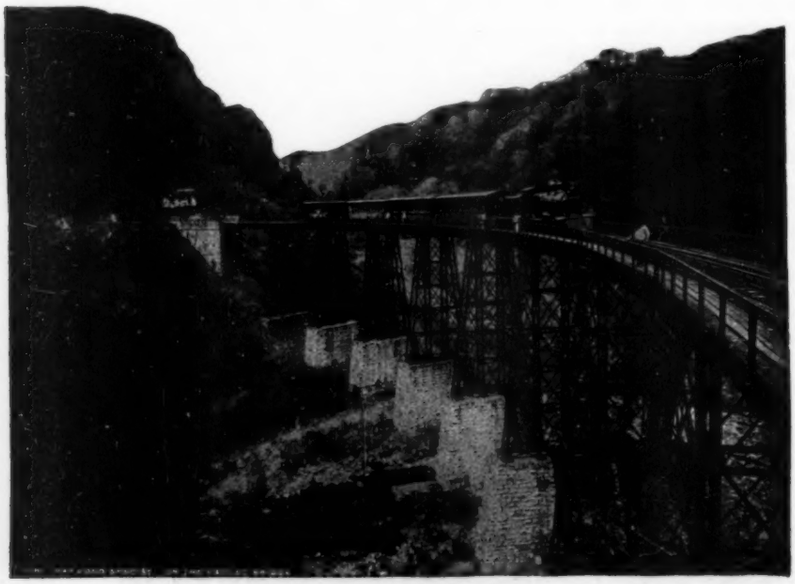
Glandorf, O., Where English Is Not Spoken and American Newspapers Never Read.

Where women work in the fields, where English is never spoken, where American newspapers are never read, and where very few, if any, modern improvements have ever penetrated—Glandorf, O., is probably the queerest town in the United States. Not the faintest echo of the rush and overwork of modern life has ever sounded here. The town is in Putnam county. It has nearly a thousand frugal and industrious German inhabitants, who hold closely to the ancient German customs as their forefathers knew them. There is but one street, and it extends for more than a mile. Back and away from this, yet so near that the laborers can be seen and heard at their work in the fields, stretch the thirty farms of the German country folk. The most remarkable building in this queer village is the Catholic church, which has made the town famous for miles about. Besides the cost of the stone for the foundation and hauling of all the material, which was given gratis, the edifice cost $50,000.

Conductors on the Florida railroads call out "Suwanee River" when their trains cross that stream. There is a scramble among the passengers to look out and see the river.

A PICTURESQUE BRIDGE OF PICTURESQUE MEXICO.

In the midst of scenery, the most picturesque of the world, is a bridge which is a source of admiration and wonderment to all tourists of Mexico. It is the Metlac bridge on the Mexican Railway, across the



METLAC BRIDGE—MEXICAN RAILWAY.

Metlac ravine, between Vera Cruz and the City of Mexico. It is built upon a curve of 325 feet radius, on a three per cent grade. It is 350 feet long and rises 92 feet above the stream. It is of cast and wrought iron, rising on eight pillars from base of masonry.

This bridge is considered by Raymond & Whitcomb, the famous tourist agents, as one of the most spectacular scenes in Mexico. Thomas A. Janvier, a writer for the company, says:

"The scenery now is of surpassing grandeur. The railway fights its way through this wild place through five tunnels and across three bridges. A little while after crossing Metlac bridge, the beautiful valley of Orizoba comes into view, with the snow-capped mountains rising beyond."

FOR AIR SHIP RACES.

The executive committee of the Louisiana Purchase Exposition will devote $200,000 to a great aerial navigation contest at the World's Fair in 1903. It will bring to St. Louis all the dirigible balloons and flying machines in the world that have made and can make a successful voyage in the air. It is hoped that the World's Congress of Aeronauts that will be brought together will finally solve the problem with which man has puzzled his brain since the earliest ages.

FIRE WHISTLE BLOWN BY NATURAL GAS.

In Kansas, where they have "natural gas to burn," is the only real fire alarm whistle in existence. It is blown by natural gas, and gives a shriek that rouses slumberers from their sleep for miles about. The whistle is in Cherryvale, Kan. The gas is furnished by a local company. One of the gas wells in the vicinity flows 13,000,000 cubic feet a day. The entire city of Cherryvale is lighted and heated by natural gas. It is the only fuel used by zinc smelters employing 300 hands, and by two vitrified brick plants.

THE FIRST SHOEMAKER.

Thomas Boyd, who came over on the Mayflower, in 1629, was the first American shoemaker. An early publication says: "He brought with him divers hydes for both sole and upp leathers. He had his dyett and houseroom at ye charge of ye companie." He went about among his customers looking for work, and making and repairing at the home of the customer."

KENTUCKY LEGISLATOR SERVES AS BARBER

John Young, a Kentucky legislator, also serves in the capacity of barber. He was elected from the "Proud City of Louisville," where he was a tonsorial artist. On arriving at the Kentucky capitol the barber refused to forsake his razors and brushes, but with them each day he shaves and combs his colleagues. When his legislative work is over he takes a chair at one of the capitol shops, relieving the regular barber.

THE PHILIPPINES AS THEY ARE.

Here is a description of the Philippine Islands as given by Edward Kinder of the Fifteenth United States cavalry, in a letter to his home folks in Evanston, Ill.:

The Philippine Islands are a bunch of trouble on the horizon. They are bounded on the north by rocks and destruction, on the east by typhoons and hurricanes, on the south by cannibals and earthquakes and on the west by sharks and smugglers.

The islands are composed of mud and mountains, and are noted for mosquitoes, ants, fleas, flies, bats, lizards, tarantulas, scorpions, centipedes, snakes, caribous and alligators and by way of variety there is also plenty of smallpox, beriberi, Dhobie's itch, leprosy, cholera and bubonic plague. Malarial fever is so prevalent that on many occasions the islands have been shaken by the vibrations of the population.

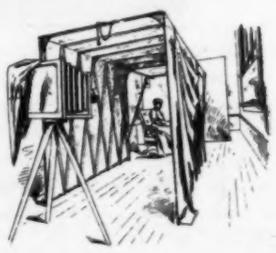
The soil is rich and produces large crops of sugar, rice, hemp, tobacco, insurrection, disease, hell and foul aromas. The total population of the islands, including everything, is 120,000 caribous, 12,000,000 people, and 12,000,000 roosters. Out of these three are 12,000,000 insurrectos, 12,000,000 amigos and the rest are gamblers and carromata drivers.

The chief industries of the Philippines are cock fighting, stealing and making bolos. The houses and dress of the Filipinos are very attractive and consist of transparency and landscapes. The Filipino wedding service is deeply impressive, especially the clause where the bride is given the privilege of doing as much work as the husband desires.

The principal diet of the Filipinos is rice and fish, fish and rice, rice and fried fish, fish and fried rice, stewed rice and boiled fish, and baked fish and boiled rice.

PHOTOGRAPHIC SCREEN.

A recent invention for use by photographers consists of a movable screen or



canopy, which may be extended or shortened. It is the idea of Hiram C. Moore of Springfield, Mass. The cut explains itself.

Frederick D. Ehlen, 81 years old, a pioneer wheelright, who died in February, lived in Chicago 46 years and never rode on street cars but six times in his life, and those times were during the World's Fair.

SIMPLE AND USEFUL WINDOW SHADE

A new window shade has been placed on the market, which commends itself for usefulness and simplicity. It is attached

to a movable support in such a manner that it can be lowered from the bottom or top, or both at the same time, making it possible to shade all of the window or any portion of it.

SIGNAL THAT MAY MAKE WRECKS IMPOSSIBLE.

A system of train signals, which, it is said, will make railroad accidents almost impossible, is to be installed on the Chicago & Eastern Illinois railroad, after a successful experiment of more than a year. The system is arranged to flash the signals inside the engine cab. It is the invention of A. C. Miller, who has just resigned his position as chief train dispatcher to the Chicago, Burlington & Quincy.

Inside the cab of the locomotive and immediately in front of the engine driver, two electric light bulbs are placed. One is red, the other white. When the track is clear ahead the white light burns and the engine driver proceeds. When there is an obstruction or all is not right with the rails in the block ahead, the white light is extinguished and the red glow flashes in the very face of the engine driver. It is a danger signal and is an imperative order to stop.

Mr. Miller, in installing his system, is using blocks three-quarters of a mile in length. Each block is operated by an ordinary track circuit, using the rails for completion of the circuit. At one end is a track battery, buried in the middle of the track, and wires lead from this to the rails. At the other end of the block, and connected with the current-carrying rails, completing the circuit, is an ordinary relay. This relay controls the circuit of the next block. When a train or anything breaks the circuit, the relay opens, communicating a danger signal through contact points on the locomotive drivers to any train in the following block, three-quarters of a mile away. Therefore, if a train entering a certain block is closely followed by another train, a red light would show in the cab of the second locomotive the instant the locomotive of the preceding train entered the block ahead, and that red light would remain on until the last wheels of the last car had passed out of the block ahead.

TIDE INDICATORS.

The Coast and Geodetic Survey has had in successful operation for several years tide-indicators at Fort Hamilton, in New York harbor; Reedy Island, in the Delaware river, and in San Francisco bay. These, fitted with dials nearly 30 feet in diameter, and with figures and divisions which can be distinguished at a distance of several miles, have indicator arms that are controlled by the direct action of the changes of water level, with which they are in close mechanical connection.

SANTOS DUMONT COMING TO AMERICA

Santos Dumont expects to visit America early next summer and here continue his experiments. He will probably make several ascensions around New York. He will bring with him two of his latest air ships, the Santos Dumonts Nos. 6 and 7, the former being the one with which the famous aeronaut won the Grand Prix de Paris by encircling the Eiffel tower and returning to his starting point in 29 minutes and 30 seconds. The Santos Dumont

No. 7 has just been completed and never tried. The aeronaut said:

"When I go to work in America next summer I shall have both Nos. 6 and 7 with me and sail both of them alternately, according to the weather and journey intended. My No. 7 carries a motor of 45-horse power, instead of the 16-horse power machine which drives the Santos Dumont No. 6. In every other respect it is also much larger than any of my previous aerostats. I shall take an assistant in it with me if I can strike the right man."

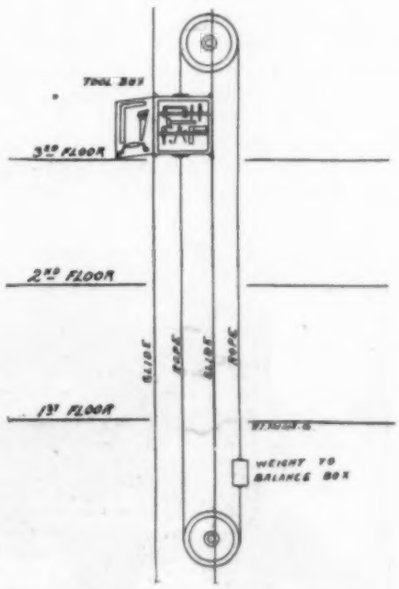
Santos, in telling how he came to take up the life of an aeronaut, said:

"I was well fitted to the business—slim and nimble and always under 110 pounds."

He laughed sneeringly, as if he wished to ridicule his 110 pounds, and would fain be able to boast of more.

A TOOL BOX ELEVATOR.

The accompanying drawing shows an arrangement that will enable the miller to have his tools on any floor he desires by simply pulling a rope, says the American



Miller. The device consists of two sheaves on which a rope is placed. A tool box is fastened to the rope, to run between two guide posts. On the opposite side of the rope a weight is placed to balance the tool box.

BEAR AND HUNTERS ARE KILLED

The steamer Tees brought to Vancouver news of the killing of a white trapper and an Indian by an enormous grizzly bear at Rivers Inlet. The dead bodies of the bear and the two men were found lying within a few feet of each other. The Indian had apparently shot the bear with a muzzle-loading rifle, wounding him. The bear then made for the Indian, caught him and killed him. The white man came to the Indian's rescue and drove a knife to the bear's heart, but himself was killed before he could extricate himself from the grasp of the dying beast.

There are 624 women physicians in European Russia. Besides there are 869 women medical students in the St. Petersburg Medical Institute for Women. The Czar distributes prizes among these students every year.

FOUND A FORTUNE IN A HARPSICORD.

A foreman stereotyper in a London printing house purchased an old harpsichord at an auction sale, because he admired the wood of the front panel. It cost him 20 shillings. When he dissected the instrument he found it had a double back. Between the boards he found Bank of England notes, molded with age, the total value of which amounted to $150,000.

THE WORLD'S OLDEST ORGAN BLOWER

Joshua Savall, 72 years old, has pumped the organ of Plymouth church, Brooklyn, without a single absence, for 37 years, and is known as the oldest organ blower in the world. On school days, says the Presto, he also pumps the organ every morning at Packer Institute. "Old Joshua," as he is called, is a negro and is blind.

COAXES SEA BIRDS TO LAKE MICHIGAN

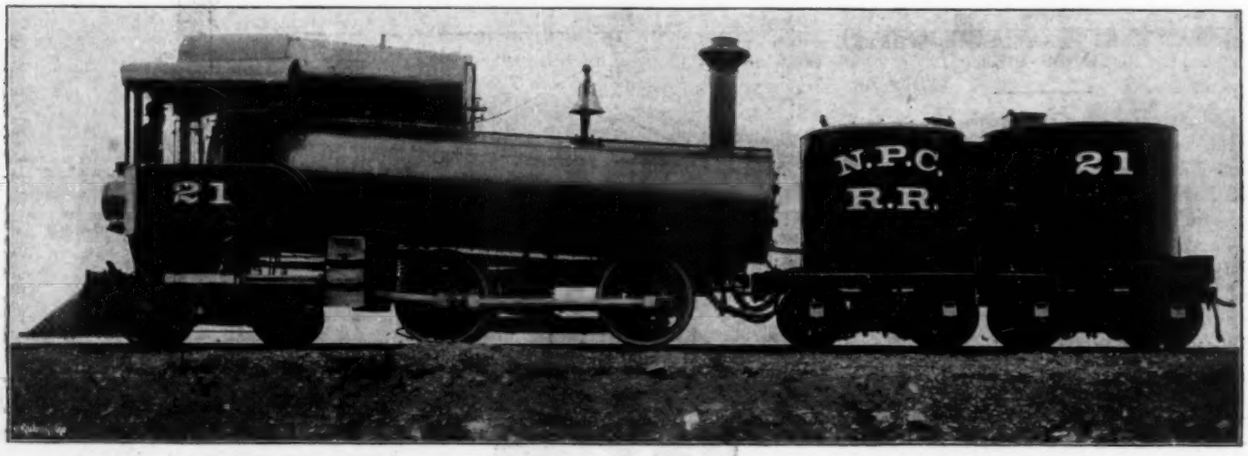
In the spring and fall thousands of salt water birds are constantly flying over the land, so high up in the air that they cannot be seen by the eye, according to the statements of Professor Frank M. Woodruff, at the Chicago Academy of Science. Every year Mr. Woodruff and J. Grafton Parker, ornithologist, go to the south end of Lake Michigan and by a system of decoys and bird calls cause the birds to come down from their lofty flight on their way to the ocean and light in the fresh lake waters.

CURIOUS OIL BURNING LOCOMOTIVE.

This odd-looking locomotive was recently built at the shops of the North Pacific Coast R. R., for the company's use. As shown in the cut, which is taken from the Railway Age, the engineers cab is at the front end. Instead of the usual steam dome, a steel cylinder is placed lengthwise on top of the boiler. The tender carries two steel tanks, one holding 1,200 gallons of water and the other 1,000 gallons of fuel oil.

NOTES ON WHEEL WEAR

The following are some notes in regard to twenty wheels by one maker, taken from the cars of one of our large street railway systems, says the Street Railway Journal: The wheels were all worn out, and had made a total of 810,000 miles. The lowest mileage made by any one wheel was 17,600 miles. The best wheel made 64,300 miles. The average life was over 40,000 miles. Six of the wheels made less than 30,000 miles, and were probably thrown out for bad flats. Eleven made over 40,000 miles, five more than 50,000 miles and two exceeded 60,000 miles. Skidding and breakage on bad crossings had much to do with the failure of many. Grooved rails, special work, and crossings where wheels have to run on their flanges, caused a large share of the broken or chipped flanges. The percentage of breakage out of one lot taken off averaged 7½ per cent, while in another lot is was 2½ per cent.



AN OIL-BURNING LOCOMOTIVE—NORTH PACIFIC RAILROAD.

LIFE SAVING SUIT.

We illustrate another type of life saving suit, which seems at present to be a favorite subject for invention. This is a water-tight suit of rubber garments, with provision for inflating with air that portion above the waist. It fits tightly at the

ankles, waist and neck, to prevent water entering. The head is also covered, leaving only the face exposed. A small light operated from a battery is placed upon the helmet and a flag completes the outfit, which is the invention of a Brazilian.

What pies were considered very annoying in olden times?—Harpies.

LATEST ANCHOR IS OF ANCIENT TYPE

Modern science and civilization, after vainly trying to invent a more perfect ship anchor has reverted to the stockless anchor, a type used by the ancient Romans in the early days of navigation. The ancient iron anchors, says the Marine Journal, were stockless, and with only one arm or fluke, such as we would now characterize as mooring anchors, and were then generally used to moor to banks or shores. In the modern stockless anchor the stock becomes only an auxiliary or disappears altogether. In a recent admiralty test the stockless anchor came out well as to penetration and holding power.

SPLIT HER SIDE LAUGHING.

Miss Louise Aiken of Terre Haute, Ind., went to a vaudeville show the other night and "split her side laughing." She felt a sharp pain in her side and her suffering increased until she was forced to leave the theater. She grew worse and a physician was summoned. He discovered that the diaphram was torn. She is recovering.

There is no "trust" in brains. It may be possible to corner the wheat crop or control the yearly output of cornstarch, but you cannot corner the crop of ideas. If the young man looks about him and studies the situation, he will quickly learn that the age of combination is also the age of brains.—Forum.

A school for bakers has been established in Chicago.

MOST POWERFUL LOCOMOTIVES EVER BUILT.

To climb the mountains of California and Arizona monster decapods, the largest locomotives ever built, are being put in service by the Santa Fe. They are engines with ten drivers. One of them recently passed through Chicago on its way west, and was a source of wonderment to all who saw it. Each of the engines weighs 259,800 pounds, or five tons more than the largest engine ever built before. The boiler stands so high that the stack is a dwarf affair, scarcely a foot high. This limit of height is enforced by the size of tunnels and bridges along the line.

The locomotives will burn oil for fuel and will carry 225 pounds of steam pressure. Their massive drivers are 57 inches in diameter. Each engine can haul a load of 2,100 tons up a 50-foot grade. The single engines will do the work formerly accomplished by "double-headers."

LESS ORNAMENT IN SLEEPING CARS.

Rich Carvings and Decorations of Past Days Are Abandoned.

Useless decorations, intricate carvings, inlaid work and delicate traceries that once adorned American sleeping cars, have nearly all been abandoned in the present up-to-date Pullman. Richly carved panels, doors, seats and sloping roofs are no longer noticed. Everything now is made as plain and polished as is possible.

"Ten years ago the car builders were in the era of extravagance," said an old Pullman conductor. "Then the Pullman and Wagner companies were competing for favoritism and spending money for decorations that never were of comfort to passengers. These ornamentations simply caught dust and dirt and made cleaning almost impossible."

ONE FOR GERMANY.

Prince Henry's entertainers in Chicago bethought themselves to show their royal guest a sample of American ingenuity. They drove him to the Northern Trust company, where he might behold the time lock equipment of the vaults.

"Wonderful," said the prince, with an air of affected seriousness.

"It is a sample of the Yankee inventive genius," said an escort, as his breast heaved with patriotic pride.

"Perfectly wonderful," said the prince, with a suppressed smile.

The lock was set and the mechanism explained in minutest detail.

"Amazing," said the prince, "but you had to go to Germany for it after all," and the prince pointed to some lettering on the lock.

The rest of the party bent low and read the lettering. It said: "Made in Germany."

Prince Henry carries a policy of $300,000 insuring him against assassination, and is said to be the only man in the world so insured.

STREET CARS AS HOUSES.

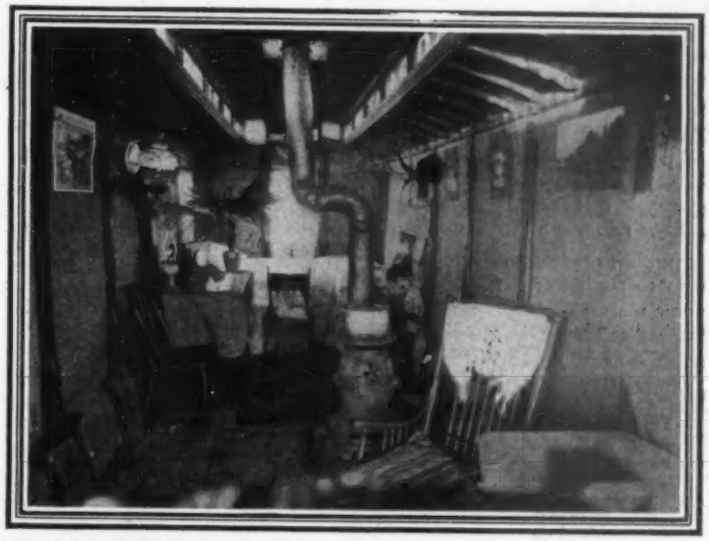
When the trolley system came into general use there were hundreds of old horse

cars which were not suitable for electric service, and they have been utilized as coal offices and similar purposes. Our illustrations show the novel use to which some of them have been put at St. Louis. Campville is the name of the little village at the World's Fair grounds in St. Louis, and two of the old cars have here been fitted up as a residence, making a cheerful and comfortable little home.

Mrs. T. D. M. Cardoza, the wealthiest woman in Philadelphia, who has bagged big game in Colorado and in the Western reserves, will go with her husband to India this spring to engage in tiger hunting for a season.

IN THE SAME OLD RUT

"Never enny changin',
Goin' every day
Just to do things over
In the saim old way;
Just the saim Old hours,
Just the saim old grind,
Everything so steddy
You could go it Blind,
Yes, it kills ambishen,
Makes us lazy—but
Golly it's so easy
Slidin' in the Rut."



ELECTRIC FANS FOR FROSTY WINDOWS

If you have an electric fan there is no need of being inconvenienced by frosty windows. Place the fan in the window, so as to diffuse the heated air over the glass as generally as possible. The same fan used for refreshing the air in summer may be used to keep the show windows free from frost in winter.

The highest lighthouse in the world has been installed at Vierge Isle, on the Road de Brest. The light is 330 feet above the sea and is visible for a distance of 39 miles.

FOR THE MADAM.

LAVISH WEARING OF JEWELRY IN PARIS

Paris says that jewelry must now be worn in great profusion. New jewelry for the hair is most striking. There are designs made to fit the coiffure almost like an open-work helmet, all in diamonds, rubies or other precious stones. The tiaras now being made in Paris for the coronation are superb. Never were women so gem laden as at present. Among those who cannot afford fortunes for such decorations imitations and real stones are mingled together haphazard.

JUMPING OFF CARS CAUSES NERVOUSNESS

Jumping off and on cars is believed by some scientists to be responsible for many of the most serious nervous derangements of the day. The jolt, they claim, causes spinal disorder, which upsets the entire nervous system. Osteopathic Health says:

Certain it is that nervousness in all its protean forms, from irritability, neurasthenia and general nervous collapse, to paralysis, is so caused. Mere slips of the vertebrae from their true position, one upon the other, and the strains brought to bear in consequence upon the ligaments and muscles binding them together, are what first occur from these innumerable poundings of hard heels against adamant pavements. These, seemingly trivial mishaps to the body, are often productive of the most far-reaching consequence.

HOW KISSES WERE INVENTED.

Kissing is said to have been invented by the Greeks. It is a custom peculiar to civilization, is indulged in but meagerly among uncultured nations, and is almost unknown to the savage.

Tradition says that a beautiful young shepherdess of Greece introduced the kiss. She found an opal, and wishing to give it to a young shepherd, whose hands were busy, let him take it from her lips with his own. So sweet it was that its delights became known to the aristocrats and has been a favored indulgence ever since. In Rome, near relatives were allowed to kiss their female kindred on the mouth, but this was done in order to know if they smelt of wine, because the Roman ladies, in spite of the prohibition, were sometimes found to have made too free with the juice of the grape. Kisses were introduced into England by the royalty when Rowena, a daughter of a Scandinavian nobleman, at a banquet, boldly kissed the British monarch Vortigern after the manner of her people.

HER POST-GRADUATE COURSE.

A girl who had been very clever at college came home the other day and said to her mother:

"Mother, I've graduated but now I must inform myself in psychology, philology, bibli—"

"Just wait a minute," said the mother. "I have arranged for you a thorough course in roastology, boilology, stitchology, darnology, patchology and general domesticology. Now, put on your apron and pluck that chicken."—What to Eat.

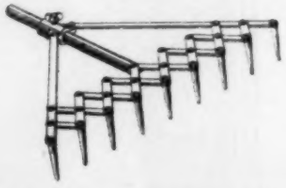
WAVE MOTOR

Inventors are still working to utilize the limitless power of the tides, which is still going to waste. We illustrate the patent of William Borchert, Carson City, Nev., and which consists of a solid track-

way and guide, on which travels a wheeled float. The incoming wave carries the float to the top of the incline, and on receding allows it to run back by gravity. Wire ropes attached to the float cause wheels to turn, in doing which air is compressed or other means of storing power effected.

ADJUSTABLE HAND RAKE

D. B. Simpson of Mt. Sterling, Ky., has invented a hand rake, the teeth of which



can be adjusted to any gage desired, according to the nature of the work to be done.

INFECTED RATS AND PLAGUES.

The discovery that the plague is disseminated by rats will necessitate a new international congress to discuss the matter of infectious diseases, declares a contributor from the Institute of Infectious Diseases in Berlin. The rulings of the conference of 1897 are now obsolete. Rats are to the spread of the plague, the writer declares, what water is to cholera. The principal preventive measure is to destroy all the rats on a ship leaving an infected port. A single infected rat escaping to shore is infinitely more dangerous to the community than plague patients, as contagion from the latter can almost certainly be controlled. Ships can be cleared of rats by means of poisonous gases, without injury to the cargo. The ship Pergamon recently arrived at Hamburg from an infected port with dead rats, but no cases of plague on board. Prompt extermination of the rats before unloading prevented any infection of the crew or workmen unloading the ship.

TO KILL WALRUS AND BEAR.

Walrus and polar bear are relied on to furnish an abundance of fresh food for the Baldwin-Ziegler polar expedition, the most perfectly equipped in history. Evelyn Briggs Baldwin, in speaking of his previous arctic experiences, said:

"On my previous trips to Franz Josef Land our first arctic camp was pitched on the southwest coast of Alger Island. Large herds of walrus were in the near neighborhood and every man who could shoot a gun or hurl a harpoon had plenty of sport.

"In nine cases out of ten, hunting the polar bear is about as much sport as shooting the family cow, but if you happen to venture on a tenth case, beware. On one of our hunting trips, when three of us were out, we sighted four bears, a mother and three cubs, coming toward us, and the male parent was not far away. We opened fire on the group. Only one bullet took effect in the mother bear. She came at us with terrific fury. Leffingwell's gun failed to fire and but for the quick work of all of us we might have been torn to pieces."

FIRST TRAIN LOAD OF EGGS INTO CALIFORNIA.

The first train with a cargo exclusively of eggs that ever passed into California was hauled recently over the Atchison, Topeka & Santa Fe railroad. For this special shipment a car was devised which is believed to be the easiest-going storage car ever built. There were twelve of these cars in the train, containing 2,000,000 eggs, all of which were loaded by one firm at Newton, Kan. The cars were built upon a plan which enabled the shippers to pack great numbers of crates, so that all available space in the cars was utilized. They were divided into apartments, says the Railway Review, so that the proper amount of air was distributed evenly to each crate. They were fitted with passenger springs and designed to ride with as little jar as a Pullman sleeper. Great difficulty is experienced in raising chickens in California, and eggs command a price of 60 cents per dozen at certain seasons of the year.

APRIL 1902

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APPALLING COST OF THE BOER WAR.

When the British entered into the Boer war they expected it to last no longer than four months. It has now lasted three years. The English considered 47,000 men ample to do the work. The British war department is now feeding 300,000 men and 243,000 horses in South Africa. It was figured that the entire cost of the war could not possibly exceed $49,000,000. Up to date Parliament has appropriated $704,948,300 for expenses of the war. It is estimated that at the close of the fiscal year, March 31, the cost will have reached $900,000,000. The total loss to the British in killed and wounded amounts to 100,701 men and 5,240 officers. "The best laid schemes o' mice and men gang aft a-gley."

BULLET-PROOF HELMETS FOR FRENCH ARMY.

The French army will soon be equipped with helmts of bullet-proof chromed steel. They are shaped like three-fourths of a cannon ball without crest or relief, causing balls or portions of exploded shells to glance off. They supplant the old models of bright steel, shakos and kepis. In spite of the weight of the new headgear soldiers declare it is not uncomfortable. Its greatest fault is its extreme ugliness.

TWO INSTEAD OF ONE.

A bicycle manufacturer who was called away from home unexpectedly at the time an interesting domestic event was expected, explained to the nurse to telegraph him as follows:

If a boy, "Gentleman safety arrived."
If a girl, "Lady's safety arrived."
The nurse wired, "Tandem."

A bright-looking young fellow with a bundle was about to go to work in a gloomy out-of-date looking shop, filled with a lot of old machinery. After looking around a bit, he decided to go out again, and as he turned, the boss stepped up to him and inquired if "he was trying to show his contempt for the shop." "No," the fellow answered, "I was trying to conceal it."—Machinery.

Divers are able to converse under water by placing their copper helmets together and shouting to each other.

Several male teachers of Frankfort, Germany, have applied for situations as policemen, owing to their remuneration being smaller than that of the average police officer.

F. M. McClintock, of Dallas, Texas, has proved himself the fastest telegrapher in America by winning first prize in every one of the four instances in the international contest at Atlanta, Ga.

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Little Willie from the mirror
Licked the mercury all off,
Thinking in his childish error,
It would cure the whooping cough.
At the funeral Willie's mother
Sadly said to Mrs. Brown—
"It was a cold day for Willie
When the mercury went down."

The Texas Oil Field Company, organized by ex-Governor Hogg of Texas, has been floated by Governor Hogg in London. It is capitalized at $4,500,000.

The Princess Radziwill has been arrested in Cape Town on the charge of forging the name of Cecil Rhodes to notes amounting to many thousand dollars.

"Want" and "For Sale" Ads. 10 cents per line payable in advance. Replies may be sent to a number, care Popular Mechanics, and will be forwarded promptly without extra charge.

SPECIAL.

FOR SALE—One 1-1 H. P. motor. One 1-8 H. P. dynamo. Photos for stamp. Roy A. Crihfield, Lincoln, Ill.

FOR SALE—Job lot new electrical goods given us to sell; list for stamp. We handle everything electrical and at lowest prices. Stamp for catalogue. Dept. N., T. Binford Electric Works, 994 Washington Blvd., Chicago, Ill.

BUSINESS CHANCES.

ENGINEERS, FIREMEN, MACHINISTS and Electricians send for 40-page pamphlet containing Questions asked by Examining Board of Engineers to obtain Engineers' license. Address Geo. A. Zeller, Publisher, room 502 18 S. 4th St., St. Louis, Mo.

OKLAHOMA 150-barrel flour mill and three elevators, all nearly new, on Rock Island Railroad in center of wheat belt. The best of locations. Will sell at a bargain. Address A. E. Stephenson, Enid, Okla.

FOR SALE OR EXCHANGE—122 acres all plow land in McHenry county; well fenced; good well and windmill; price $50 per acre. Address 400, Popular Mechanics.

FOR SALE—Locomobile runabout, nearly new, $400. Address 402 Popular Mechanics.

WANTED—To buy machinery now in use; one 250-volt Dynamo of 1,500 to 1,800 light capacity with motor balancer; moderate speed four-valve engine and boiler of about 125 H. P. Grimes Bros., Electric Light & Phone Co., Great Bend, Kan.

WANTED—500 Volt Motors, from two to fifteen horse power. Rose Electric Co., St. Louis, Mo.

FOR SALE—One full set of tinners' tools (except squaring shears) and one pipe cutting and threading outfit, ¼ to 2 inches. Charles Keil, Sherburne, Minn.

WANTED—Second hand Wire and Straightening Machine with cutter; state best cash price; and must be in good condition. The Arras Cream Separator Co., Bluffton, O.

OWING TO ILL HEALTH must seek other climate; $10,000 will buy a complete old established wholesale electrical and mechanical specialty business; $2,000 net annual income. C. S. Du Mont, 47 Jewett Bldg., Buffalo, N. Y.

WANTED—Second hand 30-inch squaring shear; must be in good condition and cheap. C. G. Schlegel, Kenesaw, Neb.

FOR SALE—My hardware and harness business; small town and small expense; stock invoiced $2,000 in January, and building and lots must go with it at $1,100. C. F. Troeller, Larrabee, Ia.

WANTED—8-foot Robinson or Keene cornice brake. Geo. E. Roesch, Aurora, Ill.

WANTED—A first-class electrotype molder or finisher; wages $18 for 54 hours. Crane & Co., Topeka, Kas.

HELP WANTED.

BREWMASTER—Twenty-two years' experience in all branches of brewing and malting business; holding a first-class diploma of well-known brewing school; a graduate of Prof. Alfred Joergensen's laboratory for purst yeast culture, Copenhagen. Address "I. P.," 512 Hart-st., Brooklyn, N. Y.

WANTED—Position as traveling expert for some reliable machine house, or to put parts together in shop. Address X. Y. Z. 237, Hillsville, Law Co., Pa.

MASTER MECHANIC OR SUPERINTENDENT of factory; sheet metal goods, cans, sheet iron stoves, stove pipes, elbows, pieced and stamped ware. "Superintendent," 1205 Chemical Building, St. Louis, Mo.

Attractions for Next Week.

"What Schley does and Dewey approves is good enough for the American people." In those few words a Denver editor said more than all the other editors combined in defending the doughty admiral. Such is the value of brevity. We will not tell you anything about Schley next week, though, for you already know about him. What we will tell you is something you don't know about.

Did you ever imagine that meteors were pieces of the earth thrown so high into space by volcanoes in early days that they are just now getting back? One scientist believes that way. Read about it in Popular Mechanics next week.

Dynamite is a most powerful explosive; we will tell you how it is made. The deepest part of the Atlantic ocean has just been discovered. Would you like to be able to hit everything you shoot at. If so all you have to do is get the right kind of a gun sight. Next week's issue will tell you the kind. It used to be that Americans had to tour Europe to finish up their education. Now Europeans have to get polished by coming to America. Were have all the tan shoes gone? Did you know that a woman makes the best shoes for athletes? The "bizarre" craze is raging in Paris; an artist there killed his model to get a death-like tint to the flesh. There is a man in Wisconsin who never carries a watch but always tells the time of day by his belt. Many other things will interest you in Popular Mechanics next week. Some people say it is the most interesting journal published.

SITUATION WANTED—As tinner in the South, about March 1st; 12 years' experience, inside and out; can clerk in store; sober and reliable; good reference. Address, E. F. Itjen, 54 Church St., Charleston, S. C.

MEXICO—Experience man wants position in the implement business in Mexico. Speak Spanish and am well acquainted with the trade. Address T. E. Bramel, Lewiston, Idaho.

BRASS FINISHER—Experienced; one who can bend pipe and assemble showers and sanitary brass work; good wages. Bailey-Farrell Mfg. Co., Pittsburg, Pa.

WOOD PATTERN MAKER—First class; experienced in stone work. A. J. Lindemann & Hoverson Co., Milwaukee, Wis.

ELECTROTYPE MOLDER—Experienced in molding and building up all kinds of work. Address with references, The Smith-Brooks Ptg. Co., Denver, Colo.

MACHINE HANDS—Wood; first-class, steady work, good wages, stock cutter preferred. Original Mfg. Co., Evanston, Ill.

POSITIONS WANTED.

HARNESSMAKER—Good, single preferred, for all-around work; at once. H. Becker & Son, Polo, Ill.

ARTIST—For general engraving work. Heybach, Bush Co., Louisville, Ky.

ENGLAND—Can accept the agency for a few lines of American manufacture in British Isles and Continental Europe. Can furnish references. Montague Cohen, 39 Paradise street, Liverpool, Eng.

Popular Mechanics

GOOD TO READ
GOOD TO THINK ABOUT
GOOD TO TALK ABOUT

WANTED—Position by sober general hand in Texas, Oklahoma and Indian Territory; 10 years' experience in hardware and harness business combined. Can make good Texas saddles. W. T. Church, Box 145, Hico, Texas.

SHEET METAL WORKER and general jobber at inside and outside work; 20 years' experience; steady position in country desired. Chas. Willis, 428 West Eighteenth street, New York.

FOREMAN, CUTTER or BENCH WORKER in cornice and skylight shop; in or outside work; German; first-class worker. Adolph Klein, 403 East Eleventh street, New York.

METAL MINE MANAGER AND SUPERINtendent—Twenty years Western and Mexican experience; good assayer; mill and cyanide man. P. O. Box 99, Steeple Rock, N. M.

PLUMBER, first-class, wishes work in city or country; wages moderate. W. Kelly, 307 East Sixtieth street, New York.

TINSMITH, first-class, having twelve years' experience in cornice and furnace work, also able to estimate on all styles of work; country town in Central States preferred. "P. A. C.," care Columbian Novelty Company, 921 Franklin avenue, St. Louis, Mo.

WANTED—By practical iron molder, a situation as foreman; many years' experience in heater and stove plate work; also in bath tubs, laboratory and sinks. Edward H. Green, 618 N. Bond St., Baltimore, Md.

ASSAYER AND CHEMIST—A graduate of the Colorado School of Mines, with eight years' constant practice at ore-sampling and chlorination plants in Colorado. C. M. P., Salt Lake City, Utah.

CUBA—I will locate in Havana this year and want a general representation for machinery, tools and hardware specialties; well acquainted with languages and customs; references; bond if necessary. C. S. Lawrence, Box 814, New Orleans, La.

UNDERTAKER—Young single man of five years' experience in the furniture and undertaking business. Will furnish any state license. Address Fred L. Griswold, Delton, Mich.